Learning Outcomes	
1.Describe the history of and evaluate the implications of biotechnology in society, e.g., ethics, medicine, agriculture, environment and industry.	1.2.1 Analyze how regulatory compliance affects business operations and organizational performance 1.3.9 Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal, organizational and professional ethical standards 1.5.8 Identify how multicultural teaming and globalization can foster development of new and improved products and services and recognition of new opportunities 1.6.6 Identify the target market served by the organization, the niche that the organization fills and an outlook of the industry 5.3.15. Describe the uses and limitations of various lab assays (e.g., HPLC, immunoassay, drainage cell, multi aspect, latex agglutination, spectrophotometry).
2.Demonstrate an understanding of the process of DNA replication, transcription, translation, and gene regulation mechanisms.	5.4.3. Explain and model the structure of DNA from nucleotide to chromosome. 5.4.4. Model the Central Dogma Theory. 5.4.5. Describe the processes involved in gene regulation. 5.4.11. Apply concepts of a pedigree.
3.Explain the theoretical basis of genome analysis, including Sanger sequencing and current sequencing technologies.	5.4.9. Compare nucleic acids and chromosomal DNA molecules using a sequence database. 5.4.14. Explain results from the Human Genome project and other sequencing projects and explain how gene sequencing is performed. 5.4.15. Perform gene analysis to determine the source of an isolated pathogen.
4.Explain the theoretical basis of recombinant DNA technologies and its application.	5.4.7. Summarize the steps in creating a recombinant DNA molecule.
5.Explain the theoretical basis of gene expression analysis and its application.	5.4.2. Identify complex gene expression and transmission patterns. 5.4.16. Explain the role of RNA and its role in gene expression.
6.Explain the theoretical basis of PCR and basic chromatography techniques for separating and identifying nucleic acids, carbohydrates, proteins, and biological metabolites.	5.4.6. Identify and isolate peptides and proteins. 5.4.8. Isolate and purify nucleic acids, including chromosomal and extra-chromosomal DNA molecules. 5.4.10. Perform and interpret the results of

	restriction enzyme digests. 5.4.12. Perform and interpret the results of a polymerase chain reaction to isolate proteins. 5.4.13. Use electrophoresis to separate nucleic acids and determine molecular weight. 5.5.7. Perform separation techniques, including chemical separations (chromatography), centrifugation, distillation and filtration and describe their principles and interpret the results 5.5.11. Perform a chromatography separation of a given mixture of substances.
7.Explore biotechnology fields and the career opportunities within each.	1.1.2. Identify the scope of career opportunities and the requirements for education, training, certification, licensure and experience. 1.1.3. Develop a career plan that reflects career interests, pathways, and secondary and postsecondary options